

## CLAIMS

1. A structural connector comprising:
  - a support plate comprising a plurality of fixed support members extending therethrough, the fixed support members having side walls and contoured tops;
  - a mating lug assembly comprising a pair of mating lug plates and a plurality of mating lugs attached to each mating lug plate, each mating lug having a support notch therein that is shaped and sized to mate with the fixed support member.
2. The structural connector of claim 1 wherein the plurality of fixed support members extend outwardly from both sides of the support plate.
3. The structural connector of claim 1 wherein the side walls of each fixed support member are substantially vertical.
4. The structural connector of claim 1 wherein the support notch of each mating lug has tapered guide surfaces at the entry point of the support notch.
5. The structural connector of claim 1 wherein the support notches of the mating lugs comprise substantially vertical side walls and contoured top surfaces.
6. The structural connector of claim 1 wherein the mating lugs are welded to the mating lug plates.
7. The structural connector of claim 1 wherein the mating lugs are formed by cutting the shape of the support notch into the mating lug plates.
8. The structural connector of claim 1 wherein a vertical load on the structural connector is carried by the mating of the contoured tops of the support notches with the contoured tops of the fixed support members.

- 1     9.     The structural connector of claim 1 wherein a horizontal load on the structural  
2     connector is carried by the mating of the side walls of the support notches of the mating  
3     lugs with the side walls of the fixed support members.
- 4     10.    A structural connector comprising:
- 5         a support plate having one or more fixed support members extending  
6             therethrough, the one or more fixed support members extending outwardly  
7             from both sides of the support plate and comprising side walls and a  
8             contoured top;
- 9         a mating lug assembly comprising one or more mating lug plates and one or more  
10            mating lugs attached to each of the one or more mating lug plates, each of  
11            the one or more mating lugs having a support notch therein;
- 12         wherein the support notch of each of the one or more mating lugs comprises  
13             tapered guide surfaces at the entry point of the support notch, side walls,  
14             and a contoured top.
- 15    11.    The structural connector of claim 10 wherein the side walls of each of the one or  
16    more fixed support members are substantially vertical.
- 17    12.    The structural connector of claim 10 wherein the side walls of the support notches  
18    of each of the one or more mating lugs are substantially vertical.
- 19    13.    The structural connector of claim 10 wherein the mating lugs are welded to the  
20    mating lug plates.
- 21    14.    The structural connector of claim 10 wherein the mating lugs are formed by  
22    cutting the shape of the support notch into the mating lug plates.
- 23    15.    The structural connector of claim 10 wherein a vertical load on the structural  
24    connector is carried by the mating of the contoured tops of the support notches with the  
25    contoured tops of the one or more fixed support members.

- 1     16.     The structural connector of claim 10 wherein a horizontal load on the structural  
2     connector is carried by the mating of the side walls of the support notches with the side  
3     walls of the one or more fixed support members.
- 4     17.     The structural connector of claim 10 wherein the structural connector is used to  
5     connect a unitized equipment floor of a drilling rig to the substructure of the drilling rig.
- 6     18.     A structural connector comprising:
- 7             a plurality of support plates each having a plurality of fixed support members  
8                     extending therethrough, the fixed support members extending outwardly  
9                     from both sides of the support plates and comprising side walls and  
10                    contoured tops;
- 11            a mating lug assembly comprising a plurality of mating lug plates and a plurality  
12                    of mating lugs attached to each mating lug plate, each mating lug having a  
13                    support notch therein;
- 14            wherein the support notch of each mating lug comprises tapered guide surfaces at  
15                    the entry point of the support notch, side walls, and a contoured top.
- 16     19.     The structural connector of claim 18 wherein the side walls of each fixed support  
17     member are substantially vertical.
- 18     20.     The structural connector of claim 18 wherein the side walls of the support notches  
19     of the mating lugs are substantially vertical.
- 20     21.     The structural connector of claim 18 wherein a vertical load on the structural  
21     connector is carried by the mating of the contoured tops of the support notches with the  
22     contoured tops of the fixed support members.
- 23     22.     The structural connector of claim 18 wherein a horizontal load on the structural  
24     connector is carried by the mating of the side walls of the support notches of the mating  
25     lugs with the side walls of the fixed support members.

- 1     23.     The structural connector of claim 18 wherein the structural connector is used to  
2     connect a unitized equipment floor of a drilling rig to the substructure of the drilling rig.
- 3     24.     A method of connecting structural components comprising:  
4             providing a first structural component with one or more support plates attached  
5             thereto;  
6             providing each support plate with a plurality of fixed support members extending  
7             therethrough, each fixed support member comprising side walls and a  
8             contoured top;  
9             providing a second structural component with one or more mating lug assemblies  
10            attached thereto, each mating lug assembly comprising a plurality of  
11            mating lug plates and a plurality of mating lugs attached to each mating  
12            lug plate;  
13            providing each mating lug with a support notch, the support notch comprising  
14            tapered guide surfaces at the entry point of the support notch, side walls,  
15            and a contoured top;  
16            positioning the first structural component and the second structural component for  
17            connection;  
18            guiding the fixed support members of the support plates into engagement with the  
19            support notches of the mating lugs using the tapered guide surfaces of the  
20            support notches.
- 21    25.     The method of claim 24 further comprising providing the fixed support members  
22    with substantially vertical side walls.
- 23    26.     The method of claim 24 further comprising welding the mating lugs to the mating  
24    lug plates.
- 25    27.     The method of claim 24 further comprising cutting the shape of the support  
26    notches into the mating lug plates.
- 27    28.     A method of connecting components of a drilling rig comprising:  
28            providing a first side box with a plurality of support plates attached thereto;

1 providing a second side box with a plurality of support plates attached thereto;  
2 providing each support plate of the first side box and the second side box with a  
3 plurality of fixed support members extending therethrough, each fixed  
4 support member comprising side walls and a contoured top;  
5 providing at least a portion of an equipment floor with a plurality of mating lug  
6 assemblies attached thereto, each mating lug assembly comprising a  
7 plurality of mating lug plates and a plurality of mating lugs attached to  
8 each mating lug plate;  
9 providing each mating lug with a support notch, the support notch comprising  
10 tapered guide surfaces at the entry point of the support notch, side walls,  
11 and a contoured top;  
12 positioning the first side box and the second side box;  
13 positioning the equipment floor for connection to the first side box and the second  
14 side box by aligning the mating lugs of the mating lug assemblies with the  
15 fixed support members of the support plates;  
16 guiding the fixed support members into engagement with the support notches of  
17 the mating lugs using the tapered guide surfaces of the support notches.  
18 29. The method of claim 28 further comprising assembling components of the  
19 equipment floor to form a unitized equipment floor.  
20 30. The method of claim 28 further comprising providing the fixed support members  
21 with substantially vertical side walls.  
22 31. The method of claim 28 further comprising welding the mating lugs to the mating  
23 lug plates.  
24 32. The method of claim 28 further comprising cutting the shape of the support  
25 notches into the mating lug plates.  
26 33. A method of connecting components of a drilling rig comprising:

1 providing a first side box with a plurality of mating lug assemblies attached  
2 thereto, each mating lug assembly comprising a plurality of mating lug  
3 plates and a plurality of mating lugs attached to each mating lug plate;  
4 providing a second side box with a plurality of mating lug assemblies attached  
5 thereto, each mating lug assembly comprising a plurality of mating lug  
6 plates and a plurality of mating lugs attached to each mating lug plate;  
7 providing each mating lug with a support notch, the support notch comprising  
8 tapered guide surfaces at the entry point of the support notch, side walls,  
9 and a contoured top;  
10 providing at least a portion of an equipment floor with a plurality of support plates  
11 attached thereto, each support plate having a plurality of fixed support  
12 members extending therethrough, each fixed support member comprising  
13 side walls and a contoured top;  
14 positioning the first side box and the second side box;  
15 positioning the equipment floor for connection to the first side box and the second  
16 side box by aligning the mating lugs of the mating lug assemblies with the  
17 fixed support members of the support plates;  
18 guiding the fixed support members into engagement with the support notches of  
19 the mating lugs using the tapered guide surfaces of the support notches.  
20 34. The method of claim 33 further comprising assembling components of the  
21 equipment floor to form a unitized equipment floor.  
22 35. The method of claim 33 further comprising providing the fixed support members  
23 with substantially vertical side walls.  
24 36. The method of claim 33 further comprising welding the mating lugs to the mating  
25 lug plates.  
26 37. The method of claim 33 further comprising cutting the shape of the support  
27 notches into the mating lug plates.  
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